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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,329	02/06/2001	Lucimara Stolz Roman	3672-0110P	9297

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EXAMINER

VU, DAVID

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/720,329

Applicant(s)

ROMAN ET AL.

Examiner

DAVID VU

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-21 is/are pending in the application.
- 4a) Of the above claim(s) 2-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1 and 5-20 are rejected under 35 U. S. C. 102(b) as being anticipated by Cao (US 5,965,281).

Regarding claims 1 and 18-20, Cao, in related text (Col.6, Lines. 7-47) and figure (Figure. 15) discloses a method in the fabrication of an electrode structure for an organic thin-film semiconducting device, wherein the semiconducting device is a rectifying diode (Col.6, Lines. 5-6 and 52-54) with a high rectification ratio of an organic thin-film transistor comprises: forming a first layer 14 of a conducting material selected from the group consisting of calcium, manganese, ITO, aluminum, nickel, copper, silver and the likes (Col. 10, Lines. 15-38) or a semiconducting material selected from the group consisting of silicon, germanium or gallium arsenide (Col. 10, Lines. 15-37) in the form of a patterned or non-patterned layer on an insulating substrate 12, such that at least a portion of the substrate 12 is covered by the first layer 14 modifying the work function of the conducting of the first layer 14 by depositing a second layer 16 of a conducting polymer with a work function higher than that of the material in the first layer

such that the layer of the conducting polymer mainly covers the first layer, whereby the combination of the first layer and the second layer constitutes the anode of the electrode arrangement and the work function of the anode becomes substantially equal to that of the conducting polymer (See Example 8, Col. 15 and See prior art reference **USPAT 5,798,170**{Col. 6, Lines. 28-32, 54-57 and Col. 6, Line 65-Col. 7, Line 1} for evidence of the state of the art in which a conducting polymer with a work function higher than that of the material in the first layer; and the work function of the anode becomes inherently equal to that of the conducting polymer, depositing a third layer 24/16 of semiconducting organic material on top of the anode, and depositing a patterned or non-patterned fourth layer 18 of a metal on the top of the third layer, whereby the fourth layer constitutes the cathode of the electrode arrangement.

In claim 1 (Lines 31-32), the limitation "if only a portion of the substrate is covered by the anode, optionally also depositing the third layer on top of at least some of the portion of the substrate not covered by the anode" is not required in the prior art (Cao et al.) reference. Since it is stated in the claim as optional when the particular condition is occurring (i.e. the limitation is a conditional limitation (i.e. "if") that is further optional and thus is not required by the claim language.).

Regarding claim 5, wherein depositing the second layer is performed by depositing the second layer as a dispersion from a dispergent or as a dissolved material from a solution. (Col. 10, Lines. 1-13)

Regarding claim 6, wherein depositing the second layer is performed by depositing the second layer in a melt application

process. (Col. 10, Lines. 1-13)

Regarding claim 7, characterized by selecting the conducting polymer in the second layer on a doped conjugated polymer. (Col. 6, Line. 54-Col. 7, Lines. 35)

Regarding claim 8, wherein the conjugated polymer or a copolymer which contains segments of  $\pi$ -conjugated moieties. (Col. 6, Line. 54-Col. 7, Line 35)

Regarding claim 9, characterized by selecting the dopant for the conjugated polymer as poly(4-styrene sulphonate) (PSS). (Col. 15, Lines. 35-60)

Regarding claim 11, characterized by selecting the semiconducting organic material in the third layer. (Col. 7, Lines 37+)

Regarding claim 12, characterized by selecting the conjugated polymer in the third layer among poly(2-methoxy, 5-(2'-ethylhexyloxy)- 1,4-phenylene vinylene) (MEH-PPV). (Col. 14, Lines 20+)

Regarding claim 13, characterized by selecting the metal of the fourth layer among metals which have a lower work function than that of the anode. (Col. 10, Lines. 15-50)

Regarding claim 14, characterized by selecting the metal of the fourth layer as the same as the metal selected for the first layer (Col. 10, Lines. 15-50)

Regarding claim 15, characterized by selecting aluminium as the metal of the fourth layer. (Col. 10, Lines. 15-50).

Regarding claims 16-17, apparatus claims 16-17 are rejected as obvious in view of the method taught by Cao.

### Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cao (US 5,965,281) in view of Yu et al. (US 6,441,395).

Cao discloses all claimed subject matter, but fails to expressly mention the doped conjugated polymers as poly (3,4-ethylenedioxythiophene) (PEDOT). Cao, in related text (Col. 15, Lines. 35-60) discloses the doped conjugated polymer as polyaniline (PANI) and polythiophene (PEDT) doped with poly(4-styrene sulphonate) (PSS). However, Yu et al., in related text (Col. 15, Lines. 5-10), disclose suitable polymers for use as the anode material such as PANI-CSA, PEDOT-PSS. It would have been obvious to one with ordinary skill in the art at the time of the invention was made to use PANI /PEDT or PEDOT as the doped conjugated polymer because these polymers can be given both the electrically conducting state and the insulating state. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PANI /PEDT or PEDOT as the doped conjugated polymer, within the general skill of a worker in the art, to select a known material on the basis of its suitability for its intended use is a matter of obvious design choice.

3. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cao (US 5,965,281) in view of Yu et al. (US 6,441,395).

Cao discloses all claimed subject matter, but fails to expressly mention depositing the third layer over at least a part of the portion of the substrate which is not covered by the anode. Yu et al, in related text (Col. 4, Line 12-Col. 10, Line. 50) and figure (Fig. 1) disclose wherein only a portion of the substrate is covered by the anode, depositing the third layer over at least a part of the portion of the substrate which is not covered by the anode. It would have been obvious to one of ordinary skill in the art at the time the invention was made for depositing the third layer over at least a part of the portion of the substrate which is not covered by the anode, within the general skill of a worker in the art, to select a known structure on the basis of its suitability for its intended use is a matter of obvious design choice.

### *Response to Arguments*

4. Applicant's arguments filed 03/17/03 have been fully considered but they are not persuasive.

It is argued, at page 5 of the remarks, that Cao '281 fails to anticipate the present invention because "Cao '281 is "missing" a layer of the present invention" and "if layer 16 of Cao '281 is equated to the third semiconducting layer of the invention, as alternatively presented by the Examiner, then the second conducting polymer layer of the invention is missing". Note that Figure 15 of Cao clearly shows two-16 layers. Therefore it is considered that layer 16 of Cao '281 (next to layer 18) is equated to the third semiconducting layer of the invention.

In response to Applicant's argument on page 8 that "It is inherent that the layer 16 cannot be a conducting polymer as this would serve to short-circuit the whole device, and moreover generate no light emission", Cao, in related text (Col. 6, lines 26-35 and figure 15) discloses that "Active layer 16, which is an electronically active organic polymer admixed with additive has a polymer grid 24 imbedded in it with the active polymer passing through the grid. This grid is conductive and can be a source of electrical signal output or, if a grid voltage is applied to it can alter the electrical characteristics of the device in the manner of a grid voltage in a classic vacuum tube triode".

In response to Applicant's argument on page 8 that "The cathode of Cao '281 is common prior art, i.e. it is well known that any good metallic conductor with a fairly low work function for injecting electrons into the semiconducting layer 16 would serve as the cathode", Cao, in related text (Col. 6, lines 12-14 and Example 7) discloses that "Because of the presence of the additive in the electroluminescent layer, cathode 18 can be formed of a high work function metal and still provide good efficiency". Therefore, the rejection of claims 1 and 5-21, as stated in the previous Office Action is maintained.

### Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO



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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (703) 305-0391. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms., can be reached on (703) 308-4910.

DV  
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